

DOCKET NO: 293591US0X PCT

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF :  
HIRONORI SUZUKI, ET AL. : EXAMINER: TAKEUCHI, Y.  
SERIAL NO: 10/586,631 :  
FILED: JULY 19, 2006 : GROUP ART UNIT: 1793  
FOR: LUBRICANT FOR POWDER :  
METALLURGY, POWDERY MIXTURE  
FOR POWDER METALLURGY, AND  
PROCESS FOR PRODUCING SINTER

APPEAL BRIEF

COMMISSIONER FOR PATENTS  
ALEXANDRIA, VIRGINIA 22313

SIR:

This is an appeal of the Final Rejection dated May 14, 2009 of Claims 1-25. A Notice of Appeal, along with a one-month extension of time, was timely filed September 14, 2009.

I. REAL PARTY IN INTEREST

The real party in interest in this appeal is Kabushiki Kaisha Kobe Seiko Sho, having an address at 10-26, Wakinohamacho 2-chome, Chuo-ku, Kobi-shi, Hyogo, Japan 651-8585, and Nippon Fine Chemical Co., Inc., having an address at 4-9, Bingomachi 2-chome, Chuo-ku, Osaka-shi, Osaka, Japan 541-0051.

## II. RELATED APPEALS AND INTERFERENCES

Appellants, Appellants' legal representative and the assignee are aware of no appeals, interferences, or judicial proceedings which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

## III. STATUS OF THE CLAIMS

Claims 1-25 stand rejected and are herein appealed.

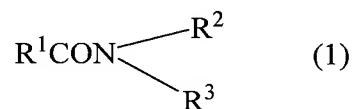
## IV. STATUS OF THE AMENDMENTS

No amendment under 37 CFR 1.116 has been filed.

## V. SUMMARY OF THE CLAIMED SUBJECT MATTER

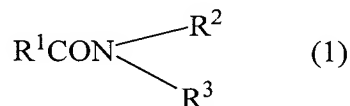
A summary of the claimed subject matter on appeal, as claimed in independent Claims 1 and 2, is mapped out below, with reference to page and line numbers in the specification added in **[bold]** after each element.

Claim 1: A lubricant for powder metallurgy **[page 5, line 11]** comprising a polyhydroxycarboxylic acid amide of the following formula (1):



(wherein R<sup>1</sup> represents an alkyl group having from 2 to 10 carbon atoms and substituted with plural hydroxyl groups; **[page 5, lines 12-16]** R<sup>2</sup> represents a hydrocarbon group having from 8 to 30 carbon atoms; **[page 5, lines 19-20]** and R<sup>3</sup> represents a hydrogen atom, or a hydrocarbon group having from 1 to 30 carbon atoms). **[page 5, lines 21-22]**

Claim 2: A lubricant for powder metallurgy [page 5, line 11] comprising a polyhydroxycarboxylic acid amide of the following formula (1):



(wherein R<sup>1</sup> represents an alkyl group substituted with plural hydroxyl groups, [page 5, lines 15-16] provided that the number of the carbon atoms constituting the alkyl group is an integer selected from a range of from n to 5 × n, in which n indicates the number of the substituted hydroxyl groups; [page 5, lines 16-19] R<sup>2</sup> represents a hydrocarbon group having from 8 to 30 carbon atoms; [page 5, lines 19-20] and R<sup>3</sup> represents a hydrogen atom, or a hydrocarbon group having from 1 to 30 carbon atoms). [page 5, lines 21-22]

## VI. GROUNDS OF REJECTION

### Ground (A)

Claims 1-5 and 15-16 stand rejected under 35 U.S.C. § 103(a) as unpatentable over US 5,952,274 (Rieckert et al).

### Ground (B)

Claims 6, 7, 9-14, 17, 18, and 20-25 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Rieckert et al in view of WO 95/33589 (Storström et al).

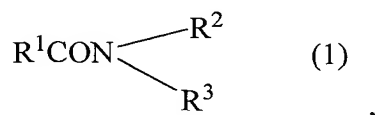
### Ground (C)

Claims 3 and 19 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Rieckert et al in view of Storström et al, and further in view of US 6,323,159 (Raza).

## VII. ARGUMENT

Claims 1-5 and 15-16 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Rieckert et al. That rejection is untenable and should not be sustained.

The present invention, drawn to a lubricant for powder metallurgy, comprises a polyhydroxycarboxylic acid amide of the following formula (1):



wherein  $\text{R}^2$  represents a hydrocarbon group having from 8 to 30 carbon atoms,  $\text{R}^3$  represents a hydrogen atom or a hydrocarbon group having from 1 to 30 carbon atoms), and  $\text{R}^1$  represents either an alkyl group having from 2 to 10 carbon atoms and substituted with plural hydroxyl groups (Claim 1) or an alkyl group substituted with plural hydroxyl groups, provided that the number of carbon atoms constituting the alkyl group is an integer selected from a range of from  $n$  to  $5 \times n$ , in which  $n$  indicates the number of the substituted hydroxyl groups (Claim 2).

Rieckert et al., on the other hand, discloses polyhydroxycarboxyl amides of sugar acids with 5 to 7 C atoms that, contrary to the finding by the Examiner, does not “broadly [teach]” polyhydroxycarboxyl amides with an  $\text{R}^2$  hydrocarbon group of from 8 to 30 carbon atoms. Indeed, the only polyhydroxycarboxyl amides disclosed by Rieckert et al. have a group corresponding to presently-recited  $\text{R}^2$  of 1 to 4 carbon atoms, i.e., “in particular alkylamides and dialkylamides with alkyl radicals having 1 to 4 C atoms (column 2, lines 3-4), N, N-dimethylgluconamide (column 2, line 11) and N,N-dimethylglucoheptonamide” (column 2, line 14). Rieckert et al. neither discloses nor suggests polyhydroxycarboxyl amides containing a group corresponding to the presently-recited  $\text{R}^2$  group having a minimum of eight carbon atoms.

In the Final Rejection, in response to the above argument, the Examiner finds that Rieckert et al “covers all polyhydrocarboxylamide [sic] in dietary foods and sugar substitutes, not just the amides of sugar acids with only 5 to 7 C atoms.”

In reply, the only acids described in Rieckert et al from which their polyhydroxycarboxyl amides are derived are the sugar acids of 5 to 7 C atoms (column 1, lines 65-67). More fundamentally, as a matter of basic organic chemistry, the acid precursor for the formula (1) recited in Claims 1 and 2 herein affects only R<sup>1</sup>; R<sup>2</sup> and R<sup>3</sup> relate to the amine precursor. Rieckert et al discloses and suggests no amine precursor for their polyhydroxycarboxyl amides containing a hydrocarbon group within the terms of presently-recited R<sup>2</sup>. Thus, *no prima facie* case of obviousness has been made out.

Nevertheless the significance of the R<sup>2</sup> group having a minimum of 8 carbon atoms is demonstrated by the Experimental Examples in the specification. Experimental Examples 2 to 6 and 8 to 12 are according to the invention; Experimental Examples 1 and 7 are comparative examples, since the R<sup>2</sup> group has less than the 8 carbon atom minimum. As described in the specification at page 44, second paragraph, flowability (critical flow diameter) and lubricity (take-out pressure) suffer when the R<sup>2</sup> group is too short. Fig. 1 graphically shows these results. See Tables 1 and 2.

The Final Rejection contains no response to this argument.

In addition, Rieckert et al's polyhydroxycarboxyl amides are not disclosed as a lubricant for powder metallurgy. Rather, it is clear from Rieckert et al's disclosure of their amides as extreme pressure (EP) additives for such vehicles such as lubricants, metal working fluids and hydraulic fluids (column 1, lines 57-61) that their polyhydroxycarboxyl amides are intended for use in a fluid, not in powder metallurgy.

For all the above reasons, it is respectfully requested that this rejection be REVERSED.

Ground (B)

Claims 6, 7, 9-14, 17, 18, and 20-25 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Rieckert et al in view of Storström et al. That rejection is untenable and should not be sustained.

While, as the Examiner indicates, a use preamble, is not given patentable weight, the particular use disclosed by Rieckert et al is relevant when combined with another reference having a different use. Thus, while Storström et al discloses a lubricant for powder metallurgy, the Examiner has provided no nexus for lubricants intended for powder metallurgy and other types of lubricants such as for metal working fluids.

In the Final Rejection, in response to the above argument, the Examiner finds that Storström et al “teaches the use of ‘other lubricants, such as ... lubricants of amide wax type’ (page 7, lines 9-11), which does not limit the lubricants to only those for use in powder metallurgy, and [Rieckert et al] teaches such a lubricant.”

In reply, Rieckert et al does not disclose or suggest the polyhydroxycarboxylic acid amide of present formula (1), nor does Rieckert et al disclose or suggest an “amide wax type” lubricant. Indeed, the Examiner has no answer to the argument that, in effect, one of ordinary skill in the art of lubricants for powder metallurgy would not look to lubricants for other uses.

In sum, even if Storström et al (which was designated as an “A” reference in the International Search Report for the international application corresponding to the present application, i.e., not particularly relevant) were combined with Rieckert et al, it would not remedy the above-discussed deficiencies in Rieckert et al.

Claims 7, 9-12, 18 and 20-23

These claims are separately patentable in view of Experimental Examples 15 to 22 in the specification, which show further improvement in flowability and lubricity when an

auxiliary lubricant is added, as described in the specification beginning at the paragraph bridging pages 44 and 45 through page 47, line 5, including Table 3, as well as Tables 1 and 2 at pages 42 and 43, respectively.

The Final Rejection contains no response to this argument.

Claims 9 and 20

These claims are separately patentable in view of Experimental Examples 15, 16, 18 and 19.

The Final Rejection contains no response to this argument.

Claims 10-12 and 21-23

These claims are separately patentable in view of Experimental Examples 20-22.

The Final Rejection contains no response to this argument.

In addition, these claims are separately patentable since the presence of a fatty acid is neither disclosed nor suggested by the applied prior art. While the Examiner relies on the disclosure of zinc stearate in Storström et al (page 7, line 10), zinc stearate (and lithium stearate also disclosed therein) are particular salts of fatty acids, not fatty acids *per se*, as any organic chemist would appreciate. Neither zinc stearate nor lithium stearate suggests stearic acid.

For all the above reasons, it is respectfully requested that this rejection be REVERSED.

Ground (C)

Claims 8 and 19 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Rieckert et al in view of Storström et al, and further in view of Raza. That rejection is untenable and should not be sustained.

The disclosures and deficiencies in the combination of Rieckert et al and Storström et al have been discussed above. Raza does not remedy these deficiencies. Raza has been relied on for a disclosure of a particular amide. Raza is drawn to a product and process for minimizing friction between relatively moving surfaces, the product including thermoplastic urethane containing an intimately interspersed additive that is capable of continually migrating outwardly from the surface of the product to provide lubrication at the interface between surfaces of the product and a surface of a relatively movable adjacent object (column 1, lines 5-15), wherein the additive is such an amide (paragraph bridging columns 1 and 2). The type of lubrication disclosed by Raza would appear to be different from the lubricant for powder metallurgy of Storström et al and the fluid lubrication of Rieckert et al. Nevertheless, even if the amide of Raza were used in the combination of Rieckert et al and Storström et al, the result would still not be the presently-claimed invention.

In the Final Rejection, in response to the last sentence of the previous paragraph, the Examiner finds that Applicants have not provided a rationale for this argument, and that when a *prima facie* case of obviousness is established, the burden shifts to Applicants to come forward with arguments and/or evidence to rebut the *prima facie* case.

In reply, the point of Applicants' argument was that the disclosure of Raza provided no reasons for why one of ordinary skill in the art would have combined Rieckert et al and Storström et al. In addition, no *prima facie* case of obviousness has been made out, and thus, no burden of rebuttal has been shifted to Applicants.



For all the above reasons, it is respectfully requested that this rejection be  
REVERSED.

VIII. CONCLUSION

For the above reasons, it is respectfully requested that all the rejections still pending  
in the Final Office Action be REVERSED.

Respectfully submitted,

Customer Number

**22850**

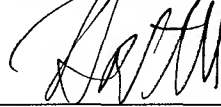
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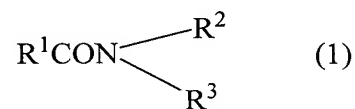
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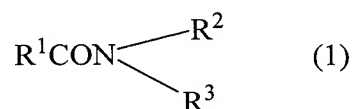
CLAIMS APPENDIX

Claim 1. A lubricant for powder metallurgy comprising a polyhydroxycarboxylic acid amide of the following formula (1):



(wherein  $\text{R}^1$  represents an alkyl group having from 2 to 10 carbon atoms and substituted with plural hydroxyl groups;  $\text{R}^2$  represents a hydrocarbon group having from 8 to 30 carbon atoms; and  $\text{R}^3$  represents a hydrogen atom, or a hydrocarbon group having from 1 to 30 carbon atoms).

Claim 2. A lubricant for powder metallurgy comprising a polyhydroxycarboxylic acid amide of the following formula (1):



(wherein  $\text{R}^1$  represents an alkyl group substituted with plural hydroxyl groups, provided that the number of the carbon atoms constituting the alkyl group is an integer selected from a range of from  $n$  to  $5 \times n$ , in which  $n$  indicates the number of the substituted hydroxyl groups;  $\text{R}^2$  represents a hydrocarbon group having from 8 to 30 carbon atoms; and  $\text{R}^3$  represents a hydrogen atom, or a hydrocarbon group having from 1 to 30 carbon atoms).

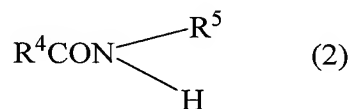
Claim 3. The lubricant for powder metallurgy as claimed in claim 1, wherein the polyhydroxycarboxylic acid amide (1) is an aldonic acid amide.

Claim 4. The lubricant for powder metallurgy as claimed in claim 1, wherein  $\text{R}^1$  has 5 carbons atoms.

Claim 5. The lubricant for powder metallurgy as claimed in claim 1, wherein R<sup>3</sup> is a hydrogen atom.

Claim 6. The lubricant for powder metallurgy as claimed in claim 1, which has a mean particle size of from 1 to 300 μm.

Claim 7. The lubricant for powder metallurgy as claimed in claim 1, which further contains an auxiliary lubricant and in which the auxiliary lubricant is at least one selected from a metal soap, an alkylenebis-fatty acid amide and a fatty acid amide of the following formula (2):



(wherein R<sup>4</sup> represents a hydrocarbon group having from 7 to 29 carbon atoms; R<sup>5</sup> represents a hydrogen atom, or a hydrocarbon group having from 1 to 30 carbon atoms).

Claim 8. The lubricant for powder metallurgy as claimed in claim 7, wherein the fatty acid amide (2) is (N-octadecenyl)hexadecanoic acid amide or (N-octadecyl)docosenoic acid amide.

Claim 9. The lubricant for powder metallurgy as claimed in claim 7, wherein the ratio by mass of the polyhydroxycarboxylic acid amide (1) to the auxiliary lubricant (former/latter) is from 30/70 to less than 100/0.

Claim 10. The lubricant for powder metallurgy as claimed in claim 7, which further contains a fatty acid.

Claim 11. The lubricant for powder metallurgy as claimed in claim 10, wherein the fatty acid is a saturated aliphatic monocarboxylic acid having from 16 to 22 carbon atoms.

Claim 12. The lubricant for powder metallurgy as claimed in claim 10, wherein the ratio by mass of the total of the polyhydroxycarboxylic acid amide (1) and the fatty acid to the auxiliary lubricant (former/latter) is from 30/70 to less than 100/0; and

the ratio by mass of the polyhydroxycarboxylic acid amide (1) to the fatty acid (former/latter) is from 20/80 to less than 100/0.

Claim 13. A mixed powder for powder metallurgy, prepared by mixing a lubricant for powder metallurgy of claim 1, and a metal powder.

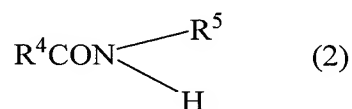
Claim 14. A method for producing a sintered body, comprising shaping a mixed powder for powder metallurgy of claim 13 through compression followed by sintering it.

Claim 15. The lubricant for powder metallurgy as claimed in claim 2, wherein  $R^1$  has 5 carbons atoms.

Claim 16. The lubricant for powder metallurgy as claimed in claim 2, wherein  $R^3$  is a hydrogen atom.

Claim 17. The lubricant for powder metallurgy as claimed in claim 2, which has a mean particle size of from 1 to 300  $\mu\text{m}$ .

Claim 18. The lubricant for powder metallurgy as claimed in claim 2, which further contains an auxiliary lubricant and in which the auxiliary lubricant is at least one selected from a metal soap, an alkylenebis-fatty acid amide and a fatty acid amide of the following formula (2):



(wherein  $\text{R}^4$  represents a hydrocarbon group having from 7 to 29 carbon atoms;  $\text{R}^5$  represents a hydrogen atom, or a hydrocarbon group having from 1 to 30 carbon atoms).

Claim 19. The lubricant for powder metallurgy as claimed in claim 18, wherein the fatty acid amide (2) is (N-octadecenyl)hexadecanoic acid amide or (N-octadecyl)docosenoic acid amide.

Claim 20. The lubricant for powder metallurgy as claimed in claim 18, wherein the ratio by mass of the polyhydroxycarboxylic acid amide (1) to the auxiliary lubricant (former/latter) is from 30/70 to less than 100/0.

Claim 21. The lubricant for powder metallurgy as claimed in claim 18, which further contains a fatty acid.

Claim 22. The lubricant for powder metallurgy as claimed in claim 21, wherein the fatty acid is a saturated aliphatic monocarboxylic acid having from 16 to 22 carbon atoms.

Claim 23. The lubricant for powder metallurgy as claimed in claim 21, wherein the ratio by mass of the total of the polyhydroxycarboxylic acid amide (1) and the fatty acid to the auxiliary lubricant (former/latter) is from 30/70 to less than 100/0; and

the ratio by mass of the polyhydroxycarboxylic acid amide (1) to the fatty acid (former/latter) is from 20/80 to less than 100/0.

Claim 24. A mixed powder for powder metallurgy, prepared by mixing a lubricant for powder metallurgy of claim 15, and a metal powder.

Claim 25. A method for producing a sintered body, comprising shaping a mixed powder for powder metallurgy of claim 24 through compression followed by sintering it.

EVIDENCE APPENDIX

None.

RELATED PROCEEDINGS APPENDIX

None.